

FIRST NORTH AMERICAN RECORDS FOR
HARMONIA QUADRIPUNCTATA (PONTOPIDDIAN)
(COLEOPTERA: COCCINELLIDAE); A LADY BEETLE
NATIVE TO THE PALAEARCTIC

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Abstract.—*Harmonia quadripunctata* (Pontopiddian), an Old World member of the tribe Coccinellini, is newly reported from three localities in the north eastern United States: Paterson and Westfield, New Jersey, and Mt. Kisco, New York. The North American specimens appear to have been derived from a single founding population which was established as early as 1924 and probably as the result of an adventive introduction. Key characteristics are given which will distinguish this species from the rest of the native and introduced North American Coccinellini. Habitat and prey preferences are briefly discussed.

Key Words: Coleoptera, Coccinellidae, *Harmonia*, aphidophagous, forest

Harmonia quadripunctata (Pontopiddian) is an Old World lady beetle of the tribe Coccinellini (*sensu* Sasaji 1971), which has become established in New Jersey and New York without any record of a deliberate introduction (Gordon 1985). A total of 8 specimens with North American collection localities have been recovered from 3 museums and one private collection. These specimens represent a minimum of 3 separate collection events (see map, Fig. 1) spanning a period of 54 and a half years and covering a linear distance of approximately 50 miles (=90 km). Although this is the first literature report on the occurrence of *H. quadripunctata* in North America, the unusually detailed specimen labels indicate that it has drawn the attention of earlier observers, some of whom were even apprised of its alien status. The diagnosis below will serve to distinguish the North American populations of *H. quadripunctata* from the rest of the introduced and native Coccin-

lini. Iablokoff-Khnzorian (1982) should be consulted for a synonymical bibliography.

Harmonia quadripunctata (Pontopiddian)
Fig. 1

Diagnosis of North American population: Form ovo-elliptic, weakly convex, 5.0 to 8.0 mm in length. Ground color of dorsal surfaces pale orange brown; pronotum of fully maculate individuals with eleven punctiform black spots, one or two pairs sometimes faint or absent; elytron immaculate or with a pair of elongate black marks at lateral margin on each side of mid-line. Tibial spurs lacking. Postcoxal line of abdomen curved posterolaterally, closely approaching or joining posterior margin of segment; oblique dividing line present.

Harmonia quadripunctata will key to the genus *Mulsantina* Weise in Gordon (1985), however it can be readily distinguished from North American members of that genus by the larger body size and the presence of an

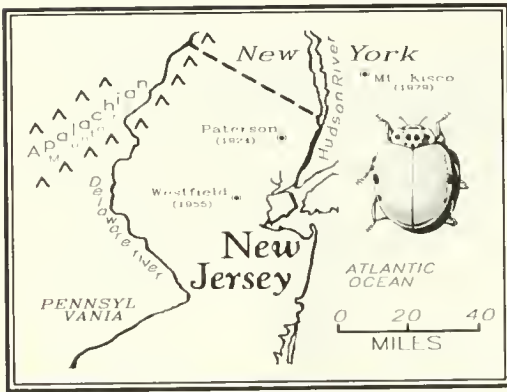


Fig. 1. Recorded North American collecting sites for *Harmonia quadripunctata* (ocellate dot); collection dates are given in parentheses. Habitus drawing of adult showing typical maculation of the North American population.

oblique dividing line in the postcoxal region of the abdomen. Although the genus *Harmonia* Mulsant is included in Gordon's key, the characters used are diagnostic only of the introduced species *H. dimidiata* (F.), which was the sole species known to occur in North America at the time. The distinctive dorsal color pattern of the North American population of *H. quadripunctata* is the best way to separate it from other members of its tribe. Members of the genus *Neoharmonia* Crotch, which also lack tibial spurs, possess fewer and larger pronotal maculae than *H. quadripunctata*.

Within its native range, *H. quadripunctata* exhibits extreme elytral color pattern polymorphism from nearly solid black, to various combinations and confluences of black spots against a pale background (Mader 1926–37, Iablokoff-Khnzorian 1982). Melanic individuals are rare in the southern part of the European continent, but a range of color forms can usually be found together at a given locality. This within population variation makes it impossible to speculate on the source area of the North American founding population even though they consistently fall at the extreme pale end of the color form spectrum.

I first became aware of the presence of *H. quadripunctata* in the United States when my colleague Stuart McKamey invited me to have a look at some coccinellids he had collected ten years earlier. I was disconcerted to find that the largest coccinellid in the box was completely unfamiliar to me, and could not be identified using any available keys to the North American fauna. The single specimen, which constitutes our most recent collection record of this exotic species, has a type-set label with the following data, "Mt. Kisco, NY Westchester Co. July 1979 Stuart McKamey Coll." and a neatly penned post script "only specimen collected, not very common."

I soon began to discover other North American specimens of *H. quadripunctata* which had previously escaped my notice. In the American Museum of Natural History, New York, a pair of the beetles were nestled inconspicuously in a unit tray of *Olla v-nigrum* Mulsant. The specimen labels contain the following data, "Westfield, N.J. Union Co., July 8, 1955 G.R. Ferguson [type-written, photographically reproduced?]/11192 C.A.F. '59 [hand-printed]." One of the specimens has two additional hand-printed labels sandwiched between the others. The white upper label reads "A very unusual immac. var 11192" and the lower blue label adds "I ought to swipe." These two specimens were collected twenty four years prior to the example captured by McKamey.

Some of the earliest collected specimens of North American *H. quadripunctata* were retrieved from the drawer of miscellaneous coccinellids in the Essig Museum, University of California, Berkeley. The find consists of a pair of card mounted beetles topping a stack of over-sized labels badly yellowed with age. The upper three labels bear the following information in a fine gray script "Paterson New Jersey Feb 27 1924 FM Schott/Bulaea lichatschovi Hummel/A Newcomer to United States found here by writer Native to Mediterranean region." A fourth label on a piece of torn and folded

paper appended to the bottom of the stack, offers the following correction in a robust black script "Harmonia quadripunctata Pontop. (North Europe)." The latter species identification has since been confirmed by comparing all of the U.S. specimens with a European series of *H. quadripunctata* from the U.S. National Museum of Natural History. Type specimens of *H. quadripunctata* have not been located (Gordon 1987b, Jablonski-Khuzorian 1982), although workers seem to be in agreement on the identity of this common palaeartic species. The entomology collection of the California Academy of Sciences has three additional specimens of *H. quadripunctata* possibly derived from the series collected by Schott. These are labeled as follows: one specimen, "Paterson N.J. II.27.24 [no collector given]/Nunenmacher collection" and two specimens on a single mount, "Bulaca lichatchovi Paterson NJ Feb 27 [no year or collector given]/R. HOPPING COLLECTION." Someone had correctly filed these examples among the European *H. quadripunctata* but had either not published or simply failed to notice the unusual collection locality.

In addition to the eight specimens mentioned above, a search through the entomology collection of the Los Angeles County Museum revealed a single example of *H. quadripunctata* placed among the undetermined North American Coccinellidae. This individual showed the same distinctive color pattern as specimens collected in New York and New Jersey, but the glossy specimen label had faded to a uniform blue-gray. The source of the specimen must therefore be considered unsubstantiated.

Although ten years have passed since the last known collection of *H. quadripunctata* in North America, I am inclined to believe that it is still present. The three known collection dates, from earliest to most recent, were separated by intervals of about 30.5 and 24 years respectively during which no additional specimens were found. The re-

cent ten year interval is therefore a comparatively short one, and since my search was by no means exhaustive, other specimens may well come to light. Several factors could have contributed to the low collection rate for this species as compared with others. In Europe, *H. quadripunctata* is most common in forested regions where fir, pine, poplar and chestnut grow (Jablonski-Khuzorian 1982, Klausnitzer and Klausnitzer 1986). It is therefore less likely that the species would turn up in an agricultural setting, which is one of the places where coccinellid activities are most intensely monitored. In addition, the species is somewhat cryptically colored and its arboreal habits would further limit the chances of a casual sighting. The very reduced elytral markings of the North American populations of *H. quadripunctata* would also tend to make it resemble lightly marked individuals of other more common species, and it might be ignored by a collector who had already "filled his quota."

It would seem unlikely that the North American specimens of *H. quadripunctata* represent fortuitously intercepted individuals transported from Europe, or specimens collected in Europe which were subsequently mislabeled. The proximity of the three collection sites, and the remarkable similarity between the color patterns of the eight specimens, strongly suggests that they have descended from a single long established population. Probably the species was accidentally introduced to the east coast of North America on board European ships. This method of transport has been suggested for *Propylea quatuordecimpunctata* (L.) (Larochelle and Lariviere 1980) another European coccinellid which became established in the vicinity of Montreal. The habit of *H. quadripunctata* of forming large dormant aggregations in crevices of tree bark (Klausnitzer and Klausnitzer 1986, Bielawski 1961) would facilitate its successful transport in this manner.

Harmonia quadripunctata is one of four

exotic coccinelline species reported as established in eastern North America in the last couple of decades. The other three species are *Propylea quatuordecimpunctata* (Chantal 1972), *Coccinella septempunctata* L. (Angelet and Jacques 1975) and *Hippodamia variegata* (Goeze) (Gordon 1987a). In all four cases the established populations were first recorded near the east coast, from Montreal to New Jersey, and appear to have resulted from either undocumented or unintentional releases. The similarities which exist in the attributes of these four species are also interesting to note. They are all members of the tribe Coccinellini, are broadly endemic to the palaearctic, primarily aphidophagous, and form large aggregations during periods of dormancy. At this point the similarity ends. The three previously reported exotic species habituate herbs and grasses. Consequently these coccinellines have drawn considerable interest for their potential role as biological control agents of the introduced Russian wheat aphid *Diuraphis noxia* (Mordvilko). In contrast, *H. quadripunctata* is almost exclusively an arboreal species. Its habitat and prey preferences in the New World will most likely coincide with those of our native species of *Anatis* Mulsant and *Myzia* Mulsant. *Harmonia quadripunctata* will probably not play an important role in the suppression of aphids in most agricultural settings, with the possible exception of some orchard crops. European populations have been recorded on *aphis pomi* (Degeer) in apple orchards (Asgari 1966), but the species is most typically associated with *Cinara* sp. in forest and woodland habitats (Klausnitzer and Klausnitzer 1986).

ACKNOWLEDGMENTS

For the use and/or loan of specimens I thank the following individuals and institutions: R. D. Gordon, U.S. National Museum of Natural History; Stuart McKamey, private collection; L. H. Herman, American

Museum of Natural History; J. A. Chemsak, Essig Museum of Entomology; D. H. Kavanaugh, California Academy of Sciences; and C. L. Hogue and R. R. Snelling, L.A. County Museum. I also thank K. S. Hagen for professional encouragement and the use of his reference library, and R.D. Gordon and M. A. Brown for their comments on earlier drafts of this manuscript.

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